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NOTICE OF ALLOWANCE AND FEE(S) DUE

2292 7590 10/17/2008

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

FERNANDEZ RIVAS, OMAR F

ART UNIT

PAPER NUMBER

2129

DATE MAILED: 10/17/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,090	03/23/2004	Tetsuya Hoya	0051-0221PUS1	1875

TITLE OF INVENTION: INTERCONNECTING NEURAL NETWORK SYSTEM, INTERCONNECTING NEURAL NETWORK STRUCTURE CONSTRUCTION METHOD, SELF-ORGANIZING NEURAL NETWORK STRUCTURE CONSTRUCTION METHOD, AND CONSTRUCTION PROGRAMS THEREFOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/20/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

2292 7590 10/17/2008

**BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747**

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/806,090 03/23/2004 Tetsuya Hoya 0051-0221PUS1 1875

TITLE OF INVENTION: INTERCONNECTING NEURAL NETWORK SYSTEM, INTERCONNECTING NEURAL NETWORK STRUCTURE CONSTRUCTION METHOD, SELF-ORGANIZING NEURAL NETWORK STRUCTURE CONSTRUCTION METHOD, AND CONSTRUCTION PROGRAMS THEREFOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional NO \$1510 \$300 \$0 \$1810 01/20/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
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FERNANDEZ RIVAS, OMAR F 2129 706-026000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/806,090	03/23/2004	Tetsuya Hoya	0051-0221PUS1	1875
2292	7590	10/17/2008	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			FERNANDEZ RIVAS, OMAR F	
			ART UNIT	PAPER NUMBER
			2129	
DATE MAILED: 10/17/2008				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 143 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 143 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/806,090	HOYA, TETSUYA	
	Examiner	Art Unit	
	OMAR F. FERNANDEZ RIVAS	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an amendment filed on 8/19/2008.
2. ☒ The allowed claim(s) is/are 1-15 and 18-21.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
|--|---|

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Greg Hsu on Thursday, October 2, 2008

The Examiner has made the following changes to the claims. Additions to the claims are reflected by underline (example) and deletions are reflected by strikethrough (~~example~~).

Claim 1

An interconnecting neural network system comprising:

a neural network unit that includes a plurality of neurons, each of the neurons embodying a weight holding unit, a pointer unit, a duration variable holding unit and an activation time holding unit, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function; and

a network control unit that constructs an artificial neural network structure by interconnecting the neurons relating to each other among the neurons in the neural network unit via ~~a~~ respective weights,

Deleted: a

wherein each of the neurons in the neural network unit outputs an excitation strength according to the similarity between the input vectors and the centroid vectors based on the kernel function when each neuron is excited by the input vector applied from an outside, and outputs a pseudo excitation strength obtained based on an the sum of excitation strength outputs from the other neurons when each neuron is excited in a chain reaction to excitation of the other neuron connected to each neuron,

Deleted: an

wherein each of the neurons in the neural network unit has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that a plurality of different input vectors of auditory modality and visual modality are handled simultaneously and independently by the neurons to perform auditory and visual recognition concurrently.

Claim 8

A computer-implemented method of constructing an interconnecting neural network structure, the method comprising the steps of:

preparing an artificial neural network structure including a plurality of neurons, each of the neurons embodying a weight holding unit, a pointer unit, a duration variable holding unit and an activation time holding unit, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, the neurons relating to each other interconnected in the artificial neural network structure via a respective weights; and

Deleted: a

training the weight that connects the neurons to each other, based on the excitation strength of each neuron,

wherein each of the neurons in the artificial neural network structure has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that a plurality of different input vectors of auditory modality and visual modality are handled simultaneously and independently by the neurons to perform auditory and visual recognition concurrently.

Claim 13

A computer-implemented method of constructing a self-organizing neural network structure including a plurality of neurons, each of the neurons embodying a weight holding unit, a pointer unit, a duration variable holding unit and an activation time holding unit, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, the neurons relating to each other being autonomously connected in the self-organizing neural network structure based on the input vector, the method comprising:

a first step of adding a neuron, which has input vectors as centroid vectors for a kernel function, into the self-organizing neural network structure as a new neuron based on input vectors that is input first from an outside; and

a second step of repeating the following processings (a) to (c), each of the processings being based on input vectors that is an n^{th} input vector from the outside, where n is an integer equal to or greater than 2:

(a) the processing of calculating excitation strengths of all the neurons in the self-organizing neural network structure based on the n^{th} input vector input from the outside;

(b) the processing of adding a neuron, which has the n^{th} input vector as a centroid vector for a kernel function, into the self-organizing neural network structure as a new neuron in case that it is determined by the processing (a) that there is no neuron excited such that the excitation strength thereof exceeds a predetermined threshold, among one or a plurality of neurons in the self-organizing neural network structure; and

(c) the processing of performing both of or one of formation of a weight that connects the neurons, and training of the formed weight based on the excitation strengths of the neurons in the self-organizing neural network structure;

wherein each of the neurons in the self-organizing neural network structure has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that a plurality of different input vectors of auditory modality and visual modality are handled simultaneously and independently by the neurons to perform auditory and visual recognition concurrently.

Claim 20

An interconnecting neural network system comprising:

a plurality of intermediate layer neurons, each of the intermediate layer neurons embodying a weight holding unit, a pointer unit, a duration variable holding unit and an activation time holding unit, each of the intermediate layer neurons outputting an

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excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, and each of the intermediate layer neurons using centroid data in a matrix form in light of time series changes as the centroid vector; and

an output layer neuron connected to each of the intermediate layer neurons and outputting a change in the excitation strength output from each intermediate layer neuron at time series,

wherein each of the neurons has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that a plurality of different input vectors of auditory modality and visual modality are handled simultaneously and independently by the neurons to perform auditory and visual recognition concurrently.

Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance: claims 1-5 and 18-21 are considered allowable since when reading the claims in light of the specification, as per MPEP § 2111.01 or *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999), none of the references of record alone or in combination disclose or suggest the combination of limitations specified in the independent claims, specifically a plurality of neurons, each of the neurons embodying a weight holding unit, a pointer unit a duration variable holding unit and an activation time holding unit (as defined at e.g. pg. 12, L25-28 and Figure 3 of the

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specification of the instant application) described in claims 1, 8, 13 and 20 of the instant application.

Gurney ("An Introduction to Neural Networks") discloses an explanation of Neural Networks using Radial Basis Function neurons.

Hatayama et al. (US Patent #6,219,657) discloses an emotion creating device that uses a neural network. A user inputs information representing conditions of a user and outputs the user's emotional state.

However, none of the references alone or in combination disclose the combination of limitations of claims 1, 8, 13 and 20, especially a plurality of neurons, each of the neurons embodying a weight holding unit, a pointer unit a duration variable holding unit and an activation time holding unit. The references fail to teach the invention without unduly motivating one of ordinary skill in the art to exert substantial experimental effort to integrate such combination concepts. Further to the Examiner's Amendment cited above, the Applicant's Remarks in the response dated 8/18/2008 are acknowledged and accepted.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Engel et al. US Patent #5,761,383

Hoya US PGPUB #2003/0115165

Kramer et al. US Patent #5,335,291

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4. Claims 1-5 and 18-21 are allowed.

Correspondence Information

5. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
United States Department of Commerce
Patent & Trademark Office

/Omar F. Fernández Rivas/
Examiner, Art Unit 2129

Monday, October 06, 2008.

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129